

BISON CONTROL AREA PROGRAM

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ABSTRACT

Bison in Wood Buffalo National Park (WBNP) and the Slave River Lowlands (SRL) are infected with bovine tuberculosis and brucellosis while both the Nahanni and Mackenzie bison populations are free of these livestock diseases. To help protect the disease-free status of these two populations, the Government of the Northwest Territories implemented the Bison Control Area (BCA) program in 1987 with the objective of reducing probability of disease transmission between herds by preventing bison from moving through or establishing herds within the area south of the Mackenzie River between the Trout and Buffalo Rivers. In order to keep this area free of bison, aerial surveys are flown to search for bison, and public participation by reporting any sightings or signs of bison is encouraged.

This program continued through the 2010/11 season with 11 weekly shoreline patrols, a semi-comprehensive survey, a comprehensive survey and a surveillance flight. In total, 74.5 hours were spent flying these surveys in fixed-wing aircraft over 19 days. Throughout the season, radio announcements and newspaper advertisements helped to communicate the purpose of the BCA and why public reports of bison are important to the program.

During the 2010/11 season, there were two reports involving bison either in the control area or heading towards it. The first report occurred in early January when a fisherman in Hay River reported shooting an injured calf on

Great Slave Lake, approximately 16 km from town. The second report was of two bison in the control area west of Buffalo River.

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INTRODUCTION

The wood bison's (*Bison bison athabascae*) original range included the boreal forests of Alaska, Yukon, southern Northwest Territories, northeastern British Columbia, northern Alberta, and northwestern Saskatchewan. Although wood bison never occurred in the large populations that plains bison (*Bison bison bison*) did, they both met the same fate during the 19th century: near extinction due to over-hunting. In 1894, there were as few as 250 wood bison remaining (Soper 1941).

Wood bison were protected by the *Buffalo Protection Act* of 1877 with enforcement by the Northwest Mounted Police beginning about 20 years later. Their numbers had rebounded to approximately 1500 by 1922 (Graham 1923) when Wood Buffalo National Park (WBNP) was established to help protect them. From 1925-1928, the federal government moved plains bison from Buffalo National Park in Wainwright, Alberta, to WBNP. How many of the 6673 bison that were shipped survived the long train and barge ride from Wainwright is still debated; some say it may have been as low as only half (e.g. Carbyn *et al.* 1993). These bison were infected with bovine tuberculosis and brucellosis from domestic livestock and subsequently spread these diseases to bison throughout the greater WBNP area (Fuller 2002). By 1934, wood bison numbers had increased to between 10 000 and 12 000 (Soper 1941).

Bovine tuberculosis and brucellosis continue to be a hindrance to fully re-establishing wood bison populations in northern Alberta and southeastern NWT.

These diseases not only threaten healthy free-ranging bison but also healthy commercial herds of both bison and cattle (Animal, Plant and Food Risk Assessment Network 1998).

Bovine tuberculosis and brucellosis are bovine diseases that originated from domestic livestock, but they will also infect other species, including humans. Bovine tuberculosis is caused by the bacterium *Mycobacterium bovis*; it is a chronic disease that causes yellow to tan nodules (tubercles) most often found in the chest cavity and lungs. Lymph nodes in the head and neck may also be swollen or necrotic. It is a progressive disease that leads to debilitation and emaciation. Brucellosis is caused by the bacterium *Brucella abortus* and causes abortions, swollen joints and swollen testicles.

Bovine tuberculosis and brucellosis were both discovered in WBNP in the 1950s (Corner and Connell 1958; Fuller 1959). In 1990, researchers examined the remains of 72 bison that had died as a result of hunting, predation, disease or natural accidents. Brucellosis was identified in 18 (25%) and tuberculosis in 15 (21%), resulting in a combined prevalence of 42% (Tessaro *et al.* 1990). The most recent study on prevalence rates of these diseases in the greater WBNP area found 49.0% of live-captured bison were positive reactors for tuberculosis and 30.9% were positive reactors for brucellosis (Joly and Messier 2004).

In 1963, 18 wood bison were released near Fort Providence in order to establish a disease-free population north of the Mackenzie River. These 18 bison were part of a previously undiscovered herd that was found in 1957 near the

Nyarling River in Wood Buffalo National Park (Tessaro *et al.* 1993). The Mackenzie bison population has since grown to be the largest, healthy, free-roaming bison population in Canada (see Figure 1). The most recent survey in 2008 estimated this population to consist of 1555 animals (± 315 , 95% C.I.) (Terry Armstrong, unpublished data).

The successful re-establishment of the Mackenzie bison population encouraged an attempt to re-establish another free ranging wood bison population in the Northwest Territories. In 1980, 28 wood bison were moved from Elk Island National Park to Nahanni Butte (Figure 1). In 1989, an additional 12 bison were released and then in 1998, 61 more animals were released into this population north of Fort Liard. By 2004, the Nahanni bison population had increased to 400 animals (Larter and Allaire 2007). This population is being monitored and is considered to be healthy and free of bovine tuberculosis and brucellosis.

Since APFRAN's (1998) risk analysis, potential paths for bison movements between the diseased and healthy populations have been investigated (Gates and Wierzchowski 2003). This study found that if bison were to pass from the greater WBNP area to the Mackenzie bison range or vice versa they would most likely move along or near the southern shoreline of Great Slave Lake near the Mackenzie River, or north of Buffalo Lake. Cooperation from all interested groups, including local, territorial and national governments as well as non-government entities and the public is needed for the BCA program to be successful because the distance between the northwest corner of WBNP and the

southeast corner of the Mackenzie Bison Sanctuary is within feasible bison dispersal range (Gates *et al.* 2001).

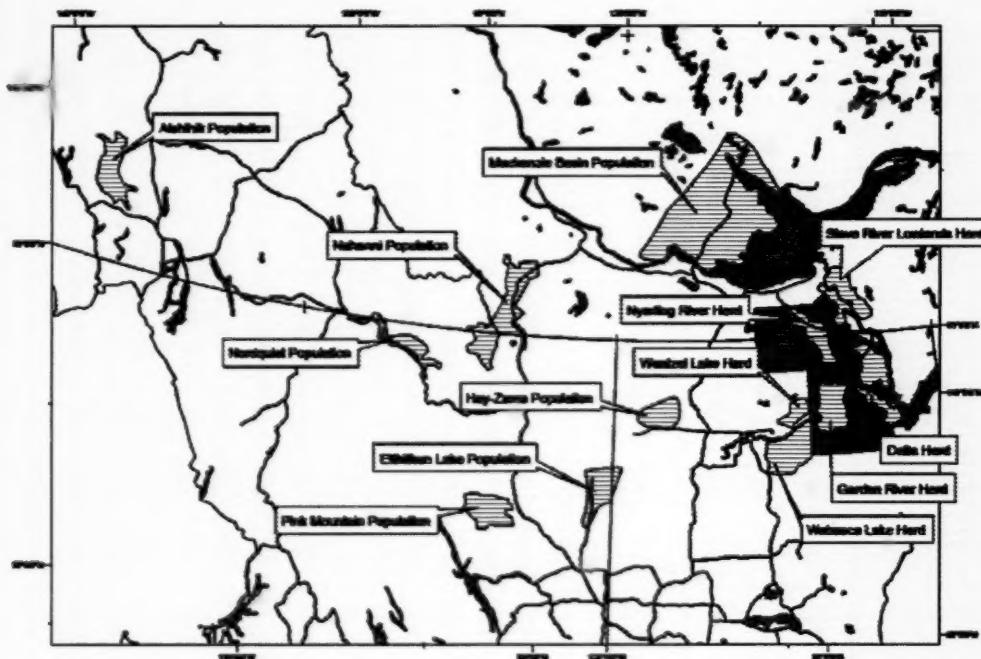


Figure 1. The current distribution of bison (*Bison bison*) in northern Canada. All populations are wood bison, except Pink Mountain, which is plains bison.

Bison Control Area Program

The Bison Control Area (BCA) was established in 1987 to reduce the risk of bovine tuberculosis and brucellosis infected bison in the Slave River Lowlands and Wood Buffalo National Park coming in contact with disease-free bison in the Mackenzie, Nahanni and Hay-Zama (Alberta) populations. The BCA is intended to be a buffer zone between infected and uninfected populations where bison are prevented from becoming established. This zone encompasses over 3,936 km² bounded in the south by the NWT border, in the north by the Mackenzie River and Great Slave Lake, in the west by the Trout River and in the east by the Buffalo River. All bison found within the BCA are assumed to be diseased and are removed and tested.

Since 1993 the bison control program has been jointly funded by the Government of the Northwest Territories (Environment & Natural Resources) and the Government of Canada (Parks Canada Agency). Both governments realize the importance of maintaining healthy wood bison herds and promoting the growth of the species.

The objectives of the BCA program are to prevent bison from moving between the Slave River Lowlands/Wood Buffalo National Park and the Mackenzie, Nahanni and Hay-Zama populations by detecting and removing any bison that may come into the area. To achieve this we:

- Conduct aerial surveillance of the BCA during the winter months

- Maintain the BCA free of bison and prevent any herds from establishing within its limits
- Increase public awareness about the program
- Confirm disease status of any bison found in the BCA

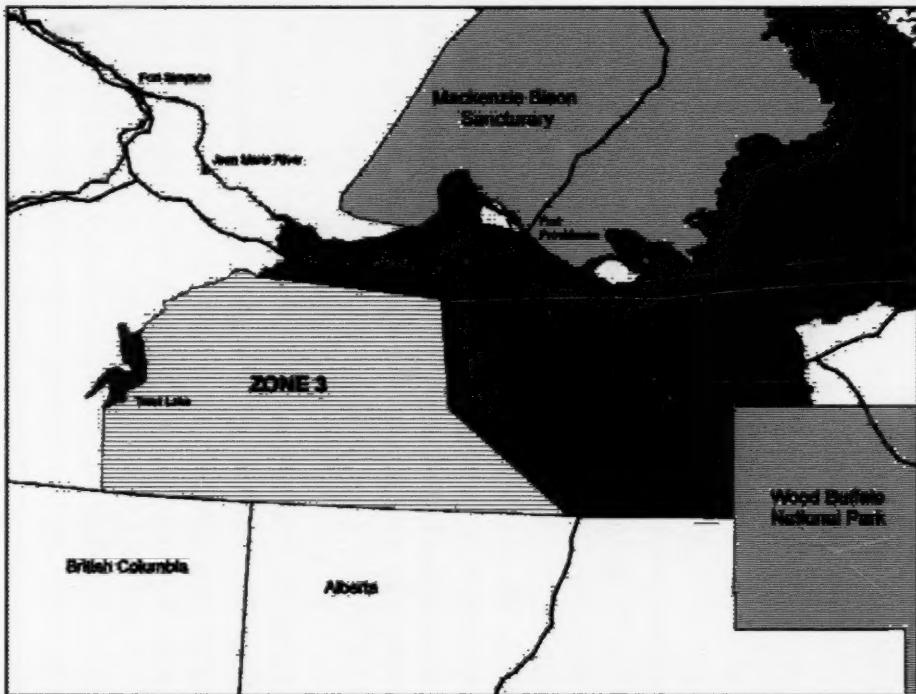


Figure 2. The Bison Control Area and its stratification into three zones.

METHODS

Survey methodology used in previous years was adopted (Gates *et al.* 1992; Williamson *et al.* 1995; Bohnet and Gates 1997; Nishi 2002; Boulanger *et al.* 2002; Bidwell *et al.* 2004; Campbell *et al.* 2004; Hartop *et al.* 2009) to assure repeatability and comparability of wildlife sightings.

The BCA is stratified into three zones (Figure 2). Zone I is the area in which bison are most likely to be seen, since it is the section of the BCA that is nearest to both the Mackenzie Bison Sanctuary and Wood Buffalo National Park. Therefore, the program focuses on this particular zone, with more frequent aerial surveillance in the form of weekly shoreline patrols. Zone II is a larger zone and is only surveyed twice a year during semi-comprehensive and comprehensive surveys. Surveillance of Zone III relies on reports from people living and travelling in the area instead of aerial surveys.

Aerial surveillance is conducted during the winter months when bison and signs of their presence (feeding craters and tracks) are most visible. Also, the probability of bison moving through the BCA is the greatest in the winter because bison are more likely to walk across the frozen Mackenzie River than swim across it in the summer.

The shoreline patrols and the comprehensive survey were flown using a Cessna 337, from Landa Aviation. A Cessna 206, from Northwestern Air Lease Ltd., was used to fly the semi-comprehensive survey. Community representatives from Fort Providence and Hay River were hired as observers on survey flights.

Each shoreline patrol was conducted by the pilot and one observer. The intern biologist from the Environment and Natural Resources (ENR) office in Fort Smith conducted both the semi-comprehensive and comprehensive surveys with help from one or two community observers. During all surveys the aircraft flew 150m to 250m above ground level and at speeds of 180 to 220 km/h.

Shoreline patrols occurred throughout the period when river crossings were possible, with an interval of around seven days. These patrols were flown along the Mackenzie River's shores between Pointe Desmarais and Axe Point and took approximately three hours to complete (Figure 3). Patrols ended when reduced snow cover made bison and their tracks difficult to see, and ice conditions on the Mackenzie River deteriorated to the point where crossing by bison became less likely than in mid-winter.

While on shoreline patrols, observers recorded current weather conditions and sightings of any large animals or their tracks. The position of each sighting was recorded using the onboard GPS and plotted on a 1:250 000 scale topographic map. Both data sheets and field maps were faxed to the wildlife technician at the ENR office in Fort Smith, who mapped the data in both OziExplorer® and ArcMap®.

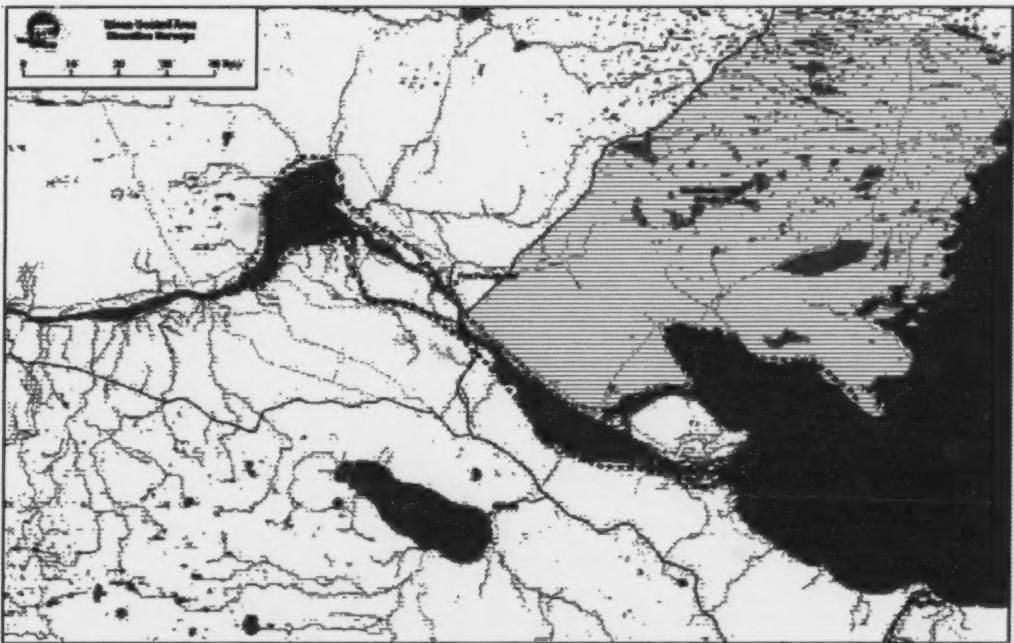


Figure 3. The approximate route followed for the weekly shoreline surveys.

A semi-comprehensive survey covering Zones I and II was flown in February 2010 (Figure 4) and a comprehensive survey was flown in March 2010, also covering Zones I and II but at a higher intensity (Figure 5). The semi-comprehensive survey followed the same flight plan that had been flown in previous years but the flight plan for the comprehensive survey was modified from the previous year because a boreal caribou composition survey had been flown in part of Zone II at the end of February. The boreal caribou survey flew transects near Kakisa and Tathlina Lakes so comprehensive survey flight paths in that area were shortened to remove overlap of flight lines (Figure 6).

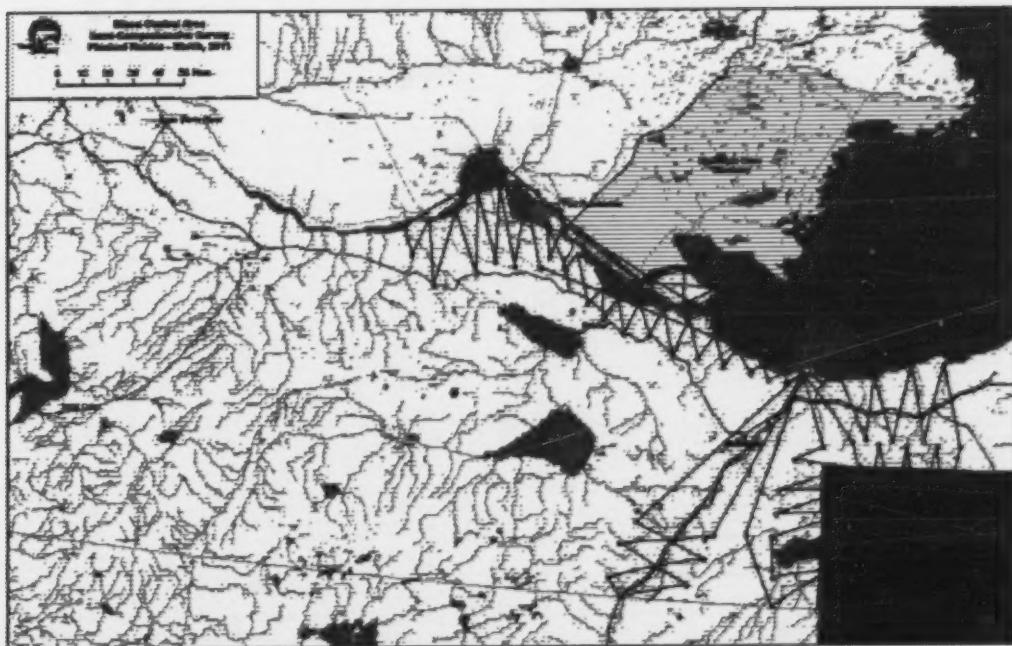


Figure 4. Routes followed during the Semi-Comprehensive Survey.

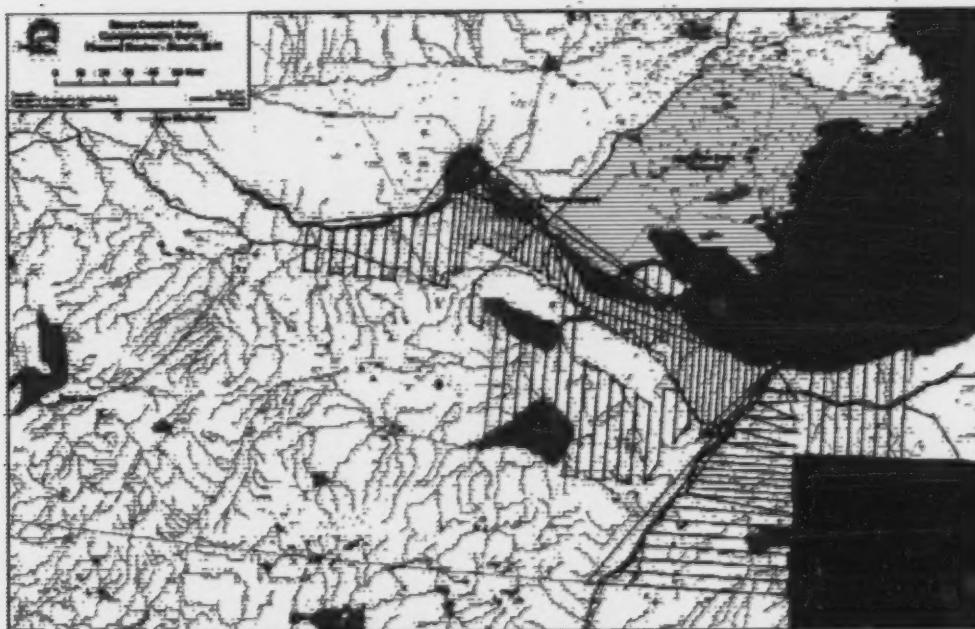


Figure 5. Routes followed during the Comprehensive Survey.

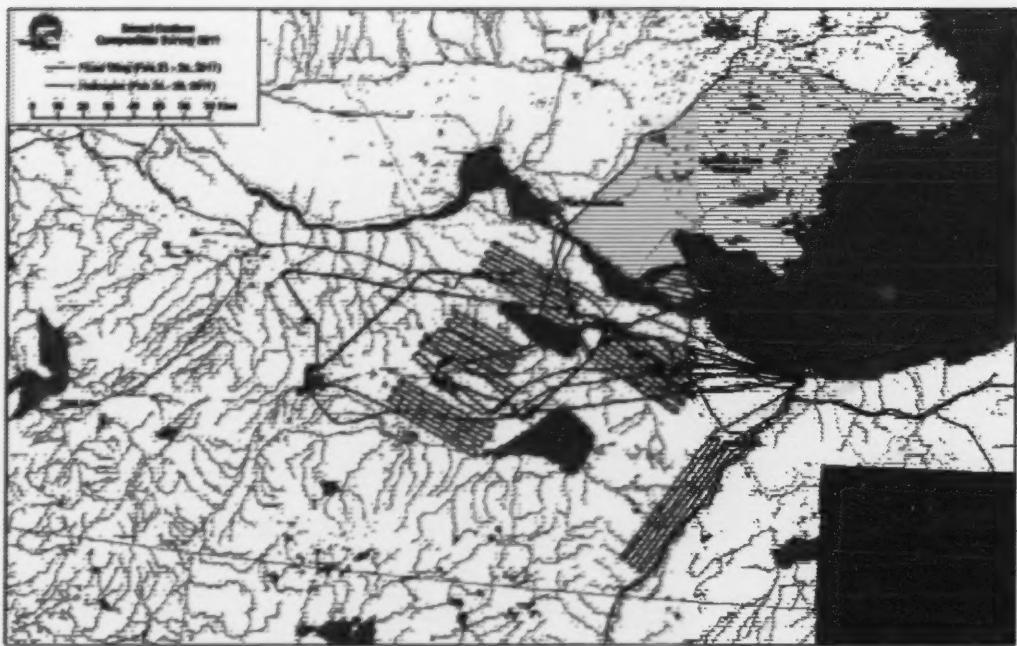


Figure 6. Flight lines showing the area covered during the boreal caribou composition survey in February 2011.

The semi-comprehensive and comprehensive surveys were transect surveys. To ensure transect width was adhered to, sticks cross-hatched with electrical tape were mounted to the aircraft. These sticks were mounted based on the formula, $w= (W/H)h$, where w is the distance on the ground, from the side of the aircraft that should be marked, W is the transect width (500 m), H is the survey height above ground (150-200 m) and h is the height from the ground to the observers' eye level when seated in the aircraft on the ground. Once the sticks were in place a test flight was done over a known 500 meter length to ensure proper placement. Using a fixed transect width allowed for accurate calculations of percent coverage.

During both the semi-comprehensive and comprehensive surveys, the program ArcPad® by ESRI was used on a Panasonic® Toughbook (Model CF-19) with a Garmin hand-held GPS to record all animals or tracks seen. Every night, the day's sightings and flight path were saved to another file on the computer hard drive as well as backed up onto a USB memory stick.

RESULTS

During the 2010/11 season, two reports of bison either entering or approaching the BCA occurred. The first report was on January 6, 2011 when a fisherman in Hay River reported to Jerry Hordal (Renewable Resource Officer – Department of Environment and Natural Resources) that he had shot an injured bison calf the previous day on Great Slave Lake. This was the first year since 1996 that a bison was shot near the BCA (Appendix A). The bison was approximately 16 km north of Hay River and was badly injured. The carcass was recovered a week later by snowmobile and brought back to Fort Smith for necropsy. The necropsy determined that the injuries were from a wolf attack and samples were taken to test for disease.

The second report was of two bison being spotted in the BCA on the west side of the mouth of the Buffalo River near Great Slave Lake on April 28, 2011. Hunters attempted to find the bison but could not so a surveillance flight was flown on May 4, 2011. The surveillance flight spent 1.1 hours searching the area where the bison had been reported but they were not spotted. The snow cover was less than 50% and the tracks in the area were too melted away to distinguish between moose and bison.

Fourteen aerial surveys were completed in 74.5 hours on 19 days of flying (Tables 1 and 2). All 3808 bison observations and their tracks observed during the surveys were seen north of the Mackenzie River, outside of the BCA. Weather conditions were recorded for each survey flight (Appendix B). Snow

cover, weather and light conditions for detecting bison and their sign from the air were good to excellent for most surveys except for a few days when low intensity, flat light conditions were encountered.

Shoreline Patrols

During all of the shoreline patrols a total of 3534 bison, 34 moose, 6 boreal caribou and 30 wolves were observed (Table 1 and Figure 7). The weekly shoreline patrols began on December 17, 2010 and finished on April 27, 2011. Shoreline patrols were not always completed at regular intervals, due to weather and Landa Aviation's schedule. Total flight time for the eleven shoreline patrols was 29.9 hours with a mean duration of 2.7 hours (Table 2).

Table 1. All recorded observations of animals and tracks seen during the shoreline surveys.

Shoreline Surveys	Bison	Moose	Boreal Caribou	Boreal Caribou Tracks	Wolf	Large Mammal Kill Site
17-Dec	395					
7-Jan	497	3				
17-Jan	512	3			12	1
31-Jan	412	7			10	
7-Feb	423		2		8	1 (bison)
21-Feb	611	14	4			
10-Mar	233	5				
17-Mar	206	2				
12-Apr	34					
19-Apr	115				7	
27-Apr	96					
TOTAL	3534	34	6	7	30	2

Table 2. Summary of BCA Shoreline surveys for the 2010/11 season.

Survey	Date	Hours Flown	Survey	Date	Hours Flown
1	17 Dec 2010	2.3	7	10 Mar 2011	2.9
2	7 Jan 2011	2.3	8	17 Mar 2011	2.4
3	17 Jan 2011	2.7	9	12 Apr 2011	3.0
4	31 Jan 2011	2.8	10	19 Apr 2011	1.7
5	7 Feb 2011	3.3	11	27 Apr 2011	2.9
6	21 Feb 2011	3.6	Total Hours = 29.9		

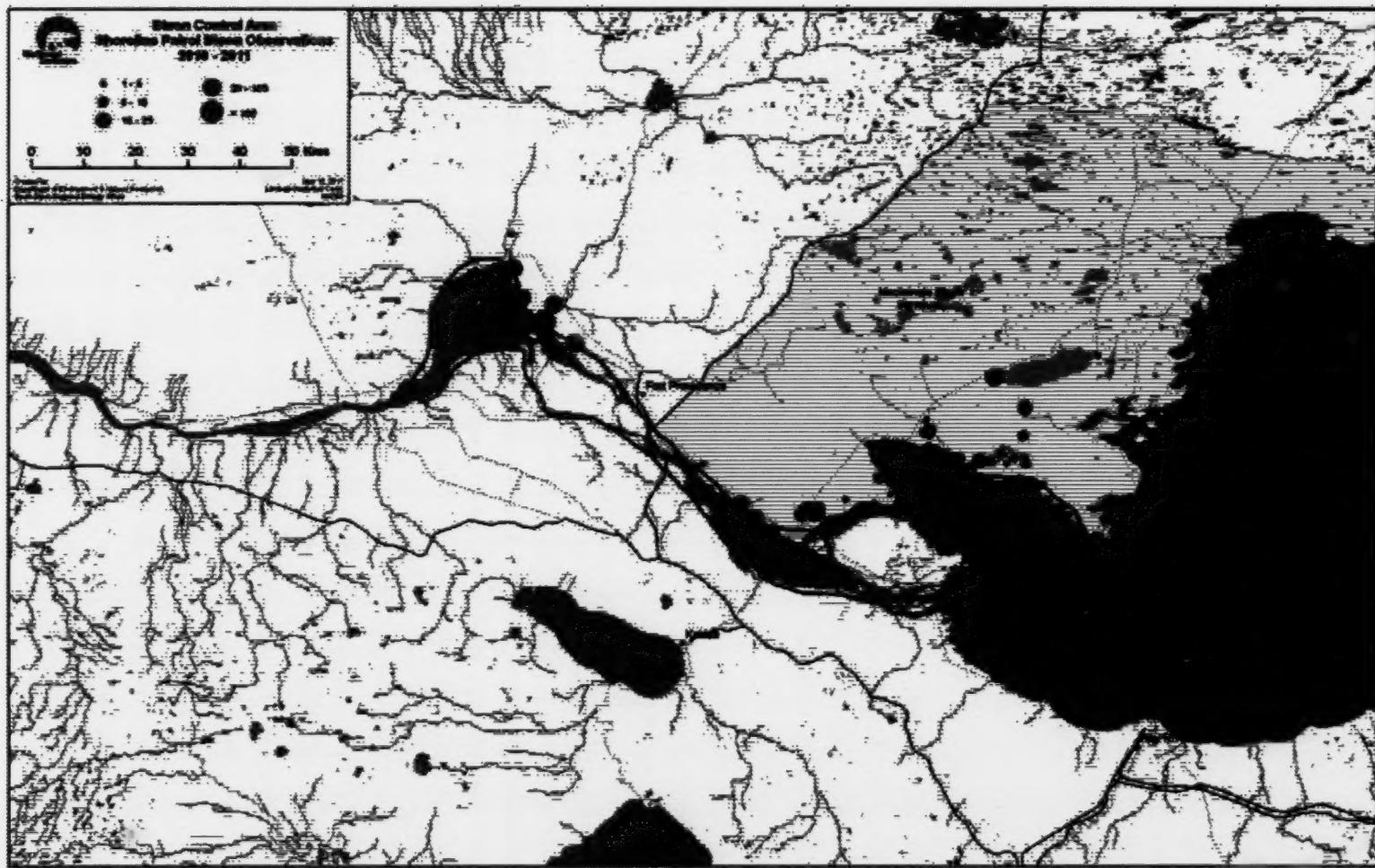


Figure 7. All recorded observations of bison during the shoreline patrols from December 17, 2010 to April 27, 2011.

The final shoreline patrol of the 2010/11 season was flown on April 27, 2011. Flights were continued to this date because of the cool weather in April, which kept snow conditions intact. After that date daytime temperatures rapidly increased to the mid-teens swiftly deteriorating snow and ice conditions. It was determined that ice conditions in these areas would likely continue to degrade very quickly and deter bison from crossing the Mackenzie River.

Transect Surveys

A total of 175 bison, 39 moose and 11 boreal caribou were observed during the semi-comprehensive survey (Table 3). The semi-comprehensive survey flight was flown February 8 – 11, 2011 (Figure 4). This survey took 16.7 hours to complete (Table 4) and flew over 1503 nautical miles of transect lines, with an estimated 7.1% coverage of the BCA. Locations of bison and bison tracks observed during the semi-comprehensive survey are summarized in Figure 8.

Table 3. All recorded observations of animals and tracks seen during the semi-comprehensive survey, February 8-11, 2011.

Semi-Comprehensive Survey

	8-Feb	9-Feb	10-Feb	11-Feb	TOTAL
Bison	0	0	4	171	175
Bison Tracks	0	0	0	8	8
Moose	7	17	6	9	39
Moose Tracks	9	2	0	0	11
Boreal Caribou	11	0	0	0	11
Boreal Caribou Tracks	16	34	4	0	54
Unknown Large Mammal Tracks	2	0	0	0	2

Table 4. Summary of BCA transect surveys for the 2010/11 season.

Survey	Date	Hours Flown
Semi-Comprehensive	8 Feb 2011	3.3
Semi-Comprehensive	9 Feb 2011	4.8
Semi-Comprehensive	10 Feb 2011	6.0
Semi-Comprehensive	11 Feb 2011	2.6
Semi-Comprehensive	TOTAL	16.7
Comprehensive	21 Mar 2011	7.1
Comprehensive	22 Mar 2011	6.9
Comprehensive	23 Mar 2011	6.8
Comprehensive	24 Mar 2011	6.0
Comprehensive	TOTAL	26.8

The comprehensive survey was flown between March 21 and 24, 2010 (Figure 5). This survey took 26.8 hours to complete (Table 3). Over 2903 nautical miles of transect lines were flown, with an estimated 13.7% coverage of the BCA. During the comprehensive survey 99 bison, 14 moose, 11 boreal caribou and 1 wolf were observed (Table 5). Locations of bison and bison tracks observed during the comprehensive survey are summarized in Figure 9.

Table 5. All recorded observations of animals and tracks seen during the comprehensive survey, March 21- 24, 2011.

Comprehensive Survey	21-Mar	22-Mar	23-Mar	24-Mar	TOTAL
Bison	2	97	0	0+1*	99+1
Bison Tracks	0	4	0	2	6
Moose	0	5+1**	3	6	14+1
Moose Tracks	10	34	43	51	138
Boreal Caribou	0	4	4	3	11
Boreal Caribou Tracks	93	103	30	85	311
Wolf	0	0	0	1	1
Wolf Tracks	0	1	3	0	4

* Wolf kill

** Hunter kill

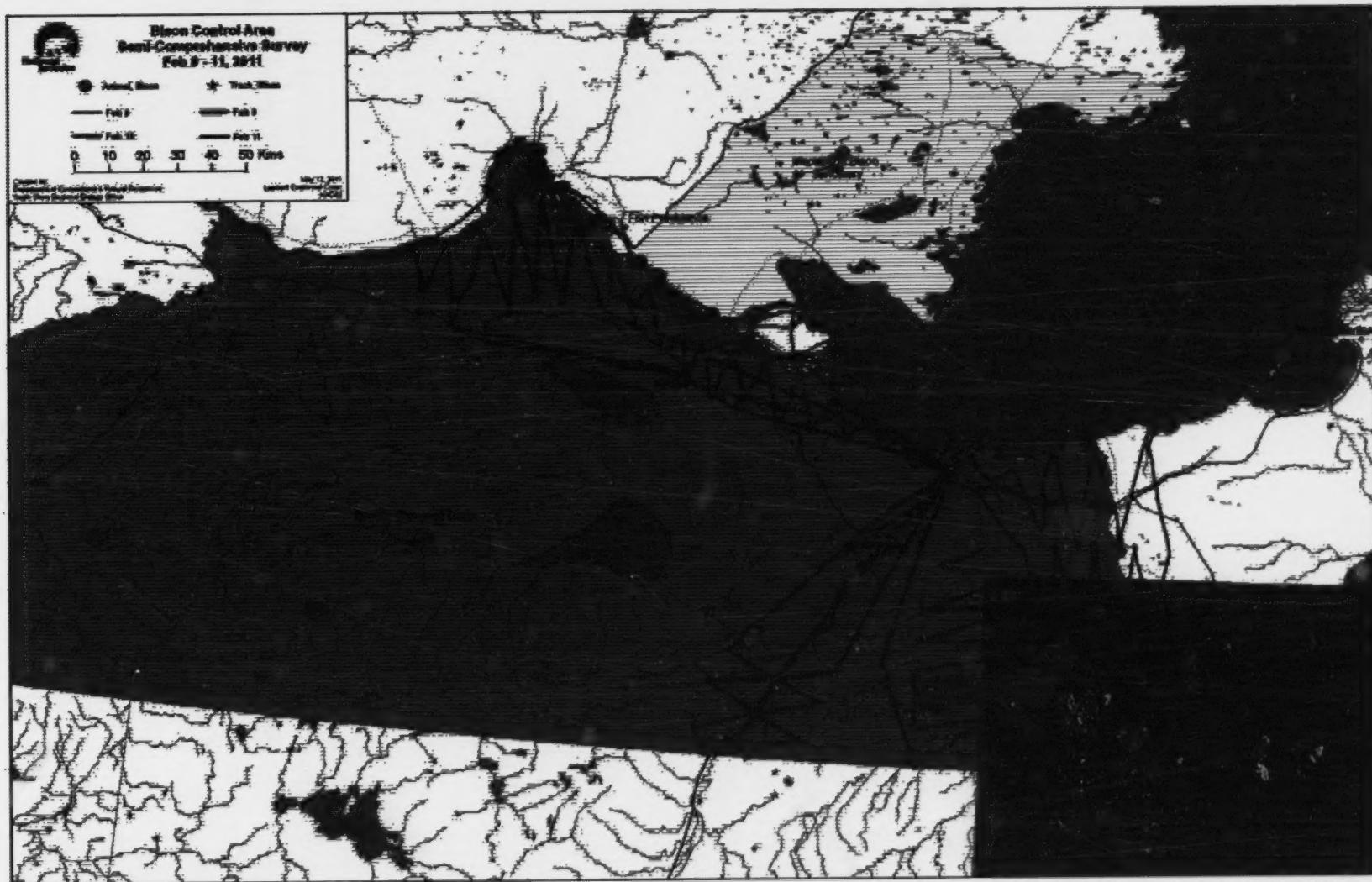


Figure 8. All bison and bison track observations recorded during the semi-comprehensive survey, February 8-11, 2011.



Figure 9. All bison and bison track observations recorded during the comprehensive survey, March 21-24, 2011.

Public Awareness

This year, the attempts at increasing public awareness included radio and newspaper advertisements. Newspaper advertisements were placed in The Hub, Hay River's local newspaper and the NWT News/North, a NWT wide newspaper (Appendix C). These advertisements are meant to remind people of where the BCA is and who to call if they see a bison in this area. They are run in September, to target people at times when they are most likely to see bison, while travelling or hunting.

A radio announcement was aired on CJCD and CKLB to inform the public about the BCA and alert anyone travelling through the BCA to report bison sightings to the nearest Environment & Natural Resources office (Appendix D). CJCD and CKLB aired 30 second long announcements twice a day every Friday, Saturday and Sunday from September 3, 2010 to October 31, 2010. CKLB also aired the announcement twice a day on July 16-18 and August 13-15. These advertisements were also placed to reach people at times when they would be more likely to be travelling through the BCA and may see bison.

DISCUSSION

Two reports of bison near or in the BCA were received during the 2010/11 season. One report was of an injured bison calf being shot on Great Slave Lake near Hay River and the second report was of two bison spotted west of Buffalo River near Great Slave Lake. The two bison west of Buffalo River could not be relocated during an aerial surveillance of the area and the tracks in the area were too melted to determine whether they were from bison or moose. These two bison could still be present in the BCA but without snow cover to help track the animals it is difficult to find them. In the past, bison have been reported and removed from the BCA with most of the sightings on the south shore of Great Slave Lake between Hay River and the Fort Providence ferry crossing (Nishi 2002). In previous years, some reports of bison sightings and tracks could not be confirmed or bison were not found in the area when a search was conducted. For some of the sightings there was a large time delay between when the bison or tracks were spotted and when it was reported to an ENR office, sometimes almost two months later (Antoniak and Gates 1995). This was not the case for the two bison spotted this year as the surveillance flight took place one week after the bison had been observed. Reports from the public will be relied upon during the summer to determine if the two bison are still present in the BCA.

Not all surveys were run under optimal conditions. However, using weather forecasts and advice from Landa Aviation's pilots, flights were done on the best possible days.

Survey lines for the semi-comprehensive and comprehensive studies were extended into the northwest corner of Wood Buffalo National Park (Figures 4 and 5) as they were in the last few seasons. Aerial surveillance in coming years should continue to include this area since bison do inhabit the northwest corner of WBNP and there is suitable habitat for bison in the Hay River area, near the NWT/Alberta border.

Newspaper and radio advertisements were part of the public awareness campaign for the 2010/11 season. Raising public awareness is a very important component of the BCA program because active surveillance takes place only during the winter months. For the remainder of the year, reports from members of the public are the only means of detecting bison within the control area. The two reports from this season illustrate the importance of public awareness programs as a component of the BCA.

ACKNOWLEDGEMENTS

Several people were integral to the smooth running of the BCA program for the 2010/11 season. Renewable Resource Officer Edward Landry and Community Support Clerk Carol Bonnetrouge helped arrange for community observers. Thank you to Ella Stinson for her help with the public advertisements.

The community observers were indispensable and we thank all of them for assisting on our surveillance flights: Lester Antoine and Henry Bonnetrouge of Fort Providence, and John Mandeville and Lyle Froehlich of Hay River. Many thanks also go to Landa Aviation Ltd. and their pilots Darcy King and Tyler King for their expertise and input as well as help that went beyond the requirements of their job. Thank you to Northwestern Air Lease and their pilot Rick Martin for flying the semi-comprehensive survey on those cold days in February.

Thank you to Allicia Kelly and Terry Armstrong for reviewing earlier drafts of this manuscript.

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APPENDIX A

**Summary of surveillance activities and removals of bison from the
Northwest Territories Bison Control Area (1988/89 – 2010/11)**

Year	Shoreline Patrols	Semi-Comprehensive Surveys	Comprehensive Surveys	Total Hours	Snow-mobile Ground Patrols	Bison Removals
1988	1					
1989	2					
1990	2					
1991		7				
1992			3			9 ^a
1993	14 ^b		1		23	
1994	10	6 (94)	1 (34)	15	33	2 ^d
1995	11	3 (48)	1 (41)	12		3 ^e
1996	21	3 (45)	1 (46)	15		
1997	14	3 (46)	1 (48)	13		
1998	14	2 (30)	1 (45)	11		
1999	14	2 (28)	1 (46)	11		
2000	13	2 (30)	1 (50)	12		
2001	14	2 (29)	1 (42)	11		
2002	11	2 (22)	1 (40)	87		
2003	13	1 (11)	1 (37)	78		
2004	12	1 (14)	1 (33)	76		
2005	11	1 (14)	1 (36)	88		
2006	12	1 (19)	1 (36)	93		
2007	13	1 (15)	1 (33)	88		
2008	11	1 (15)	1 (30)	78		
2009/	9 (27)	1 (13)	1 (13)	53		
2010/	11	1 (17)	1 (27)	74		1 ^f

^a 17 May 1992: 7 bulls shot near Point de Roche

31 May 1992: 1 bull shot near Point de Roche (no lymph nodes collected)

Serological testing for *Brucella* was negative for all 9 bulls, no lesions consistent with tuberculosis observed on gross pathology or histopathology

^b Four patrols covered the Hay River area and extended inland to the northwest park boundary

^c Numbers in brackets represent survey hours (rounded off to the nearest hour)

^d 8 March 1995, 1 cow shot by hunter along south shore of Mackenzie River. Cow had likely been wounded by wolves. Blood serum and retropharyngeal lymph nodes collected.

13 October 1994, prior to the surveillance season beginning, 1 bison shot by hunter near the eastern boundary of the BCA. Blood and tissue samples collected but no evidence of brucellosis or tuberculosis.

^a 19 March 1996: 3 cows killed by hunter on the south shore of Mackenzie River. Blood serum (n=2) and retropharyngeal lymph nodes (n=3) collected. No serological reactors to brucella, and lymphatic tissue normal on gross examination.

^f 5 January 2011: 1 injured young of the year female was killed by a fisherman north of Hay River on Great Slave Lake (coordinates: 60° 59' 17.1" N 115° 51' 05.5" W). It was collected on January 12th and brought back to Fort Smith. A necropsy was performed and wounds were found on the front left shoulder and the hindquarters and appeared to be from a wolf attack. Retropharyngeal, submandibular, prefemoral, prescapular, popliteal and bronchial lymph nodes and tonsils were collected for testing.

APPENDIX B***Weather conditions during the BCA program, Season 2010-2011***

Table B.1. Weather data during the shoreline patrols

Date	Patrol	Temp	Winds	Sky	Light	Intensity	Snow Cover
Dec 17	1	-22°C	0	Broken	Bright	High - Medium	Complete
Jan 7	2	-14°C	0	Broken	Flat	N/A	Complete
Jan 17	3	-24°C	0	Scattered	Bright	Medium	Complete
Jan 31	4	-19°C	2 kts - NE	Clear	Bright	High	Complete
Feb 7	5	-15°C	5 kts - SW	Scattered		High - Medium	Complete
Feb 21	6	-10°C	10 kts - WNW	Scattered /Overcast	Bright /Flat	High - Medium	Complete
Mar 10	7	-23°C	5 kts - SE		Bright	High	Complete
Mar 17	8	-5°C	10 kts - W			Medium	Complete
Apr 12	9	-15°C	5 kts - S	Clear	Bright	High	Complete
Apr 19	10	-2°C	0	Partially Obscured	Bright	Medium	Complete
Apr 27	11	5°C	0	Scattered	Bright	High	Complete

Table B.2. Weather data during the semi-comprehensive and comprehensive surveys

Date	Survey	Temp	Winds	Sky	Light	Intensity	Snow Cover
Feb 8	Semi	-25°C	Calm - ENE	Clear	Bright	High	Complete
Feb 9	Semi	-27°C	5 kts - 130°	Clear	Bright	Medium	Complete
Feb 10	Semi	-18°C	5 kts - 170°	Over	Flat	Low	Complete
Feb 11	Semi	-20°C	5 kts - 150°	Over	Flat	Low	Complete
Mar 21	Comp	-8°C	10 kts - 130°	Clear	Bright	High	Complete
Mar 22	Comp	0°C	10 kts - SE	Over	Flat	Medium	Complete
Mar 23	Comp	0°C	10 kts - 130°	Clear	Bright	High	Complete
Mar 24	Comp	0°C	10 kts - 040°	Scatt	Flat	Medium	Complete

APPENDIX C

Quarter page black and white advertisements that are run in the Hay River Hub.

Bison Control Zone

A control zone, preventing contact between diseased and healthy bison lies south of the Mackenzie River to the Alberta border and between Trout River and Buffalo River. All bison in this zone are presumed to be disease carriers and must be removed for testing. If you see bison in the control zone, please contact your nearest Environment and Natural Resource Officer or call 1-866-829-5400. For more information visit www.enr.gov.nt.ca

Environment and Natural Resources

APPENDIX D***CJCD and CKLB Radio Advertisement Script***

Bison populations in Wood Buffalo National Park and the adjacent Slave River Lowlands are infected with disease and must be removed for testing.

A buffer zone lies south of the Mackenzie River to the Alberta border, between Trout River and Buffalo River, to prevent contact with diseased bison.

Motorists and hunters are requested to report any sightings of bison in the buffer zone to the nearest Environment and Natural Resources office, or by calling 1-866-629-6438.

NWT residents play an important part in the bison control program. Thank you for your participation.

APPENDIX E**2010-2011 BCA Expenses**

Travel and Accommodation	\$2,887.65
Wages (observers)	\$3,733.29
Advertising	\$4,473.08
Aircraft Charters	\$66,758.35
BCA Technician (In kind support)	\$31,050.00
Total	\$108,902.37

A BCA technician was not hired for the 2010/11 season because an intern biologist, employed in the Fort Smith ENR office, helped run the BCA program.